report at the end of the first year) in any University at home or abroad, or in some other institution approved of by the Commissioners. The scholars are to devote themselves exclusively to study and research in some branch of science, the extension of which is important to the industries of the country. A limited number of the scholarships are renewed for a third year where it appears that the renewal is likely to result in work of scientific importance.

	Nominating institution	Scholar
1	University of Glasgow	Robert John Tainsh Bell
2	University of St. Andrews	James C. Irvine
3	Mason University College, Birmingham	Henry Leonard Heathcote
4	University College, Bristol	Winifred Esther Walker
5	Yorkshire College, Leeds	Frederick William Skirrow
6	University College, Liverpool	Charles Glover Barkla
7	University College, London	Harriette Chick
8	University College, London	Henry James Tomlinson
9	Owens College, Manchester	Frank Austin Lidbury
10	Durham College of Science, Newcastle-upon-Tyne	William Campbell
11	University College, Nottingham	Louis Lownds
12	University College of Wales, Aberystwyth	James Travis Jenkins
13	University College of North Wales, Bangor	Robert Duncombe Abell
14	Queen's College, Belfast	William Caldwell
15	McGill University	William Brown McLean
16	University of Melbourne	Bertram D. Steele

The following scholarships granted in 1898 have been continued for a second year on receipt of a satisfactory report of work done during the first year:—

	Nominating institution	Scholar	Place of study
1	University of Glasgow	James Frank Bottomley	Owens College; to proceed to University College, London
2	University of Aberdeen	Alexander Findlay	University of Leipzig
3	Mason College, Birmingham	A. H. Reginald Buller	Botanical Institute, Leipzig; to proceed to University of Munich
4	Yorkshire College, Leeds	Harry Thornton Calvert	University of Leipzig
5	University College, Liverpool	Ernest Brown	Central Technical College, South Kensington
6	Owens College, Manchester	James Henry Smith	Owens College (*permitted under special circumstances*)
7	Durham College of Science, Newcastle-upon-Tyne	Arthur William Ashton	University College, London
8	University College, Nottingham	Austin Henry Peake	Cavendish Laboratory, Cambridge
9	Royal College of Science for Ireland	Robert L. Wills	Cavendish Laboratory, Cambridge
10	Queen's College, Galway	Hugh Ryan	University of Berlin
11	University of Toronto	William Gabb Smeaton	University of Leipzig
12	Dalhousie University, Halifax, Nova Scotia	Ebenezer Henry Archibald	Harvard University

The following scholarships granted in 1897 have been exceptionally renewed for a third year:—

	Nominating institution	Scholar	Place of study
1	University of Glasgow	James Muir	Engineering Laboratory, Cambridge
2	University of St. Andrews.	Harry McDonald Kyle	Gatty Marine Laboratory, St. Andrews, Laboratoire Arago, Banyuls-sur-mer; Königliche Biologische Anstalt, Heligoland
3	University College, Bristol	Charles Henry Graham Sprankling	Owens College, Manchester
4	Yorkshire College, Leeds	Harold Albert Wilson	Cavendish Laboratory, Cambridge
5	University College of South Wales and Monmouthshire	Maria Dawson	Botanical Laboratory, Cambridge
6	University of Melbourn	Walter Rosenhain	Engineering Laboratory, Cambridge

IN connection with the article on the duties of provincial professors, which recently appeared in these columns, it is worthy of note that, according to the *Hochschul-Nachrichten*, 22 per cent. of the professors in the German universities are engaged in lecturing or laboratory supervision two to six hours a week, and 51 per cent. from seven to twelve hours. Of the associate professors 60 per cent. are engaged from two to six hours per week, and of the privatdocents 82 per cent. Only 4 per cent. of all privatdocents are engaged in lecturing or laboratory supervision more than twelve hours a week. As *Science* remarks, the leisure of the German associate professors and docents explains in large measure the amount of research work accomplished in German universities.

SCIENTIFIC SERIAL.

American Journal of Mathematics, vol. xxi, No. 3, July.—This number opens with a long memoir (64 pp.) by Dr. L. E. Dickson, entitled "Determination of the Structure of all Linear Homogeneous Groups in a Galois Field which are defined by a Quadratic Invariant." This is an attempt at a complete determination of this important type of groups. Dr. Dickson's work is familiar to the students of "groups" in this country by his papers in the *Quarterly Journal* (on the first hypoabelian group generalised, 1898), in the American *Bulletin* (the structure of the hypoabelian groups, July 1898, also of the *Bulletin* for February and May 1898), and in the *Proc. of the Lond. Math. Soc.* (the structure of certain linear groups with quadratic invariants, vol. xxx. pp. 70-98). Two new systems of simple groups are obtained in the present memoir, and thereby some results in the earlier papers are correlated and completed. (References are freely given to results obtained by other workers in this field.)—Upon the ruled surfaces generated by the plane movements whose centrodes are congruent conics tangent at homologous points, by Dr. E. M. Blake. The movements considered are thus defined. Upon a plane α' containing a conic C′ moves a coincident plane α, containing a conic C congruent to C′, in such a manner that C and C′ are always tangent at homologous points, *i.e.* C and C′ are the centrodes of the movement. The locus of a point rigidly attached to α is a curve of the fourth order when C and C′ are central conics, and of the third order when they are parabolas. The locus is in a plane parallel to α', and the same distance from it that the generating point is from α. The locus of a straight line carried by α and making an angle with it, is a quartic scroll when the centrodes are central conics, and a cubic scroll when they are parabolas. The object of the paper is to describe the forms of these scrolls, and the character and situation of their nodal lines and pinch-points. The results are to be regarded (1) as furnishing a method of mechanically generating certain cubic and quartic scrolls, and (2) as exhibiting the totality of line-loci of the movements considered. These results are believed, by the author, to be new.—The remaining two papers are by J. C. Glashan, and their nature is indicated by their titles, viz. "Quinquisection of the Cyclotomic Equation" (read, in abstract, at the British Association meeting of August 29, 1897, *cf.* Prof. Cayley's paper on the subject in vol. xii. of the *L. Math. Soc. Proc.*), and on the m fold section of the cyclotomic equation in the case of m prime. (Useful references are given to previous memoirs on the subject.)—Accompanying this number is an index to volumes xi.-xx.—The editorial staff is announced to consist of Prof. Newcomb, with the co-operation of A. Cohen, Frank Morley, Charlotte A. Scott, and other mathematicians.—This is strong enough for any work that may be placed before it.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 15.—"On the Waters of the Salt Lake of Urmi." By R. T. Günther, M.A., and J. J. Manley, Daubeny Curator, Magdalen College. Communicated by Sir John Murray, F.R.S.

This paper contains an account of a physical and chemical investigation of the waters of the great salt lake of Urmi in Azerbaijan, North-west Persia. Samples of the water were

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collected by Mr. R. T. Günther during his expedition to the lake last summer, and were examined by Mr. J. J. Manley in the laboratory of Magdalen College, Oxford. The specific gravity of one of the samples of the water at 15° C. was about 1·11338; its boiling point under normal conditions in a platinum bottle was 103·84° C., as determined by a form of platinum resistance thermometer. The refractive index (μ) was found to be 1·36110 by a method which the authors consider to be applicable to ordinary sea waters, and to be capable of yielding an indication of the physical nature of the water which is both more accurate and more readily obtainable than the ordinary specific gravity. The chemical examination was, with a slight modification, similar to that employed by Dittmar in his work on the composition of the ocean water collected by the *Challenger*. The hypothetical proximate composition of 100 parts of the total salts was calculated with the following results:—

Sodium chloride	86·332
Magnesium chloride	6·661
Magnesium sulphate	4·211
Calcium sulphate	0·988
Potassium sulphate	1·741
	99·933

A trace of barium was detected by the spectroscope. No iodine or bromine could be discovered.

It is to be hoped that the constitution of the lake water will be determined again at intervals of a few years, in order to show whether or not the salinity is undergoing any change, and if so, in which direction.

PARIS.

Academy of Sciences, July 31.—M. van Tieghem in the chair.—The Perpetual Secretary announced to the Academy the loss it had sustained by the death of M. Rieggenbach, correspondent in the Section of Mechanics.—Thermogenesis and use of energy by man in raising and lowering his own weight, by M. A. Chauveau. The positive work done by the animal motor is shown by experiment to take from the animal heat an amount quantitatively equal to the mechanical work produced. When the subject does negative work in the calorimeter, the heat produced is much greater than should arise from the normal physiological work of the organism.—On the law of pressures in gun-muzzles, by M. E. Vallier. The author applies the formula previously given by him to the discussion of some experiments by M. Zaboudski, and introduces certain simplifications into his original expression.—Hypodermic impregnation in the *Haementaria castata* of Müller (*Placobdella catenigera* of R. Blanchard), by M. A. Kowalevsky.—On the annular nebula in Lyra, from observations made at the Observatory of Toulouse, by MM. Bourget, Montangerand, and Baillaud. The observations show unmistakably that very sensible changes of brightness have taken place in this nebula during the last twenty years.—Observations of β-Lyræ, made at the Observatory of Lyons, by M. M. Luizet.—On the variable star (D.M. + 12°·3557) of the Algol type, by M. Luizet.—On the methods of M. Loewy for the determination of latitudes, by MM. W. Ebert and J. Perchot.—The variations of the apparent horizon, by M. F. A. Forel. The possible error in the measurement of the position of the true horizon deduced from observation of the apparent horizon, is greater when the air is calm than when it is in motion, and greater than when the air is warmer than the water than the reverse; hence the observations are best taken in the morning.—On the equations of Pfaff, by M. E. O. Lovett.—On certain differential equations, by M. Henri Dulac.—On the changes of state of iron and steel, by M. H. Le Chatelier.—On the electric deformations of solid isotropic dielectrics, by M. Paul Sacerdote.—On the spectra of oscillating discharges, by M. G. A. Hemsalech.—With the oscillating discharges, a particular value for the self-induction of the circuit can be made to give a spectrum almost totally free from air lines, and showing very clearly the characteristic rays of the metals forming the electrodes.—On the isomeric states of chromium acetate: biacid abnormal violet acetate and a green abnormal monoacetate, by M. A. Recoura.—Action of magnesium upon saline solutions, by M. Georges Lemoine. Concentrated solutions of magnesium chloride rapidly disengage hydrogen when treated with magnesium powder, magnesia being simultaneously formed.—On the dissociation of the hexammoniacal cadmium chloride, by MM. W. R. Lang and A. Rigaut.—On the dissociation of mercurdiammonium iodide, by M. Maurice François. The compound of mercuric iodide and ammonia behaves similarly to the ammoniacal silver chlorides, the dissociation pressures showing that an intermediate compound $3HgI_2.4NH_3$ exists.—Action of sodammonium and potassammonium upon selenium, by M. C. Hugot.—On some acetonylacetonates, by MM. G. Urbain and A. Debierne. In the present paper details are given of the iron, manganese, cobalt, chromium, and aluminium compounds.—Action of mineral substances and organic acids upon the variations of resistance and modifications of the system, by MM. Charrin, Guillemonat, and Levaditi.—Immunity and specificity. Remarks on the preceding note, by M. Ch. Bouchard.—On the gluten and nitrogenous material of flour, by M. Balland. As flour grows older, the gluten appears to undergo a change, as it loses its coagulating properties, and is carried away in increasing quantity by washing with water.—Estimation of carbon dioxide at the summit of Mt. Blanc, by M. Maurice de Thierry. Details of estimations of ozone and carbonic acids carried out at Chamonix and Grand Mulets in August and September 1898.

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